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APPEAL BRIEF

TITLE: Modular Electrochemical Processing System
U.S. SERIAL NO.: 10/770,737
FILING DATE: February 3, 2004
INVENTOR: Chen et al.
EXAMINER: Brenda A. Lamb
GROUP ART UNIT: 1734
CONFIRMATION NO.: 1009

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PATENT
Atty. Dkt. No. APPM/007164.C1/CMP/ECP/RKKIN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCESIn re Application of:
Chen et al

Serial No.: 10/770,737

Filed: February 3, 2004

For: MODULAR
ELECTROCHEMICAL
PROCESSING SYSTEM§
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Confirmation No.: 1009

Group Art Unit: 1734

Examiner: Brenda A. Lamb

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February 5, 2007
Date
Keith M. Tackett

Dear Sir:

APPEAL BRIEF

Applicants submit this Appeal Brief to the Board of Patent Appeals and Interferences on appeal from the decision of the Examiner of Group Art Unit 1734 dated July 14, 2006, finally rejecting claims 1-3, 5-6, 9, and 21-28. The final rejection of claims 1-3, 5-6, 9, and 21-28 is appealed. This Appeal Brief is believed to be timely since mailed by the extended due date of February 5, 2007, as set by mailing a Notice of Appeal on December 5, 2006. Authorization to charge the fee of \$500.00 for filing this brief is provided on a separate fee transmittal. Please charge any additional fees that may be required to make this Appeal Brief timely and acceptable to Deposit Account No. 20-0782/APPM/007164.C1/KMT.

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Real Party in Interest

The present application has been assigned to Applied Materials, Inc., 3050 Bowers Avenue, Santa Clara, California 95054.

Related Appeals and Interferences

Applicant asserts that no other appeals or interferences are known to the Applicant, the Applicant's legal representative, or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

Claims 21-24 and 26-28 are pending in the application. Claims 1-20 were originally presented in the application. Claims 21-31 were added in Applicants' Response to Office Action dated January 4, 2006. Claims 1-20, 25 and 29-31 have been canceled without prejudice. Claims 21-24 and 26-28 stand finally rejected as discussed below. The final rejections of claims 21-24 and 26-28 are appealed. The pending claims are shown in the attached Claims Appendix.

Status of Amendments

All claim amendments have been entered by the Examiner, including amendments to the claims proposed after the final rejection.

Summary of Claimed Subject Matter

Claimed embodiments of the invention are directed to a modular processing system (paragraph [0014] lines 1-2).

In the embodiments of independent claim 21, an electroless processing system (paragraph [0015] lines 1-2, paragraph [0017] line 20, and 100 in FIG. 1)), comprising a factory interface (paragraph [0015] lines 2-4 and 101 in FIG. 1) having a substrate transfer robot (paragraph [0015] lines 8-10 and 104 in FIG. 1) positioned therein, the factory interface being configured to communicate with at least one substrate containing cassette (paragraph [0015] lines 4-8 and 103 in FIG. 1); and at least two substrate processing modules (paragraph [0015] lines 2-4 and 102 in FIG. 1) in detachable communication with the factory interface (paragraph [0027] lines 1-6), each of the at least two substrate processing modules including a pretreatment/post treatment cell (paragraph [0017] lines 12-15 and 201 in FIG. 2) and an electroless processing cell (paragraph [0014] lines 9-15, paragraph [0017] lines 2-6 and 16-21, and 202 in FIG. 2) is provided.

Grounds of Rejection to be Reviewed on Appeal

1. Claims 21, 23-24, and 26-28 stand rejected under 35 U.S.C. § 102(e) as being anticipated by *Hongo et al.* (U.S. Pat. No. 6,921,466, hereinafter, "*Hongo*").

2. Claim 22 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Hongo* in view of *Verhaverbeke et al.* (U.S. Published Pat. Appl. No. 2003/0045098, hereinafter, "*Verhaverbeke*").

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ARGUMENTS**A. Anticipation of Claims 21, 23-24 and 26-28 over *Hongo******The Applicable Law***

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Claims 21, 23-24, and 26-28 stand rejected under 35 U.S.C. § 102(e) as being anticipated by *Hongo*. Applicants respectfully traverse this rejection because *Hongo* does not disclose "each and every element as set forth in the claim[s]."

The Reference

Hongo is directed to a semiconductor substrate processing apparatus comprising a carry-in and carry-out section for carrying in and carrying out a semiconductor substrate having a surface on which a circuit is formed, in a dry state; an annealing unit for annealing the semiconductor substrate; a polishing unit for polishing at least part of the plated metal film on the semiconductor substrate; a cleaning unit for cleaning the semiconductor substrate held by a revolution member support apparatus; and a transfer mechanism for transferring the semiconductor substrate between the units (col. 4 line 66 to col. 5 line). Each of said units is interchangeable (col. 5 lines 60-61).

The Examiner's Argument

Regarding claim 21, the Examiner argues that *Hongo* "teaches the design of an electroless processing system, comprising: a factory interface having a substrate transfer robot or first robot positioned therein, the factory interface being configured to communicate with at least one substrate containing cassette; and at least two substrate processing modules are interchangeable within the system and thereby is in detachable communication with and removable from the factory interface, each of the at least two substrate processing modules including a pretreatment/post treatment cell and an electroless processing cell as shown in Figure 36 or Figure 45 (see paragraphs 0038-0039, 0312 and 0336)" (page 5 of Examiner's Final Office Action mailed July 14, 2006; hereinafter "Examiner's Final Action"). The Examiner continues to argue in the Continuation Sheet of the Advisory Action dated September 28, 2006 that in one embodiment of *Hongo* as shown in Fig. 36 "the processing system may include other pre-treatment apparatus and post-treatment apparatus which is conducted in a cell separate from the electroless plating cell (see for example cleaning unit as depicted in Figure 37)." The Examiner further argues in the Continuation Sheet of the Advisory Action dated October 27, 2006 that the *Hongo* "processing system includes a[n] electroless processing cell and a pretreatment/post treatment cell and teaches at column 34 lines 7-11 and column 5 lines 59-65 that units within the processing system can have the same dimensions thereby enabling one to detach/separate and replace individual units therein and which would inherently imply to one skilled in the art that multi-cells or multi-units in the *Hongo* et al processing system which define a processing module within the processing system can be detached/separated and replaced with another module with multi-cells or multi-units having the same dimensions."

Applicants' Response to the Examiner's Argument

Respectfully, Applicants submit that *Hongo* fails to teach, show, or suggest "at least two substrate processing modules in detachable communication with the factory interface, each of the at least two substrate processing modules including a pretreatment/post treatment cell and an electroless processing cell" as recited in independent claim 21. In other words, any interchangeable unit (detachable module) as

taught by *Hongo* does not include both a pretreatment/post treatment cell *and* an electroless processing cell. The Examiner is referred to reference numerals 102, 201, and 202 in FIG. 2, paragraph [0014] lines 9-15, paragraph [0017], and paragraph [0026] lines 6-14 of the present application as an illustrative example and description of two separate cells within a single detachable module of an electroless processing system, in accordance with the claims.

Rather, *Hongo* teaches that there may be a detachable electroless plating unit, such as a seed layer forming unit, and a *separate* detachable cleaning unit (col. 5, lines 4-5, 21-27, and 59-65). Again with regard to FIG. 31, *Hongo* teaches a *separate* electroless Cu plating unit (seed layer forming unit 112) or electroless Ru plating unit (barrier layer forming unit 111) and a separate cleaning unit 115 or 118, wherein the *individual* units (plating, cleaning, annealing, and the like) may be interchangeable (col. 33, line 59 to col. 34, line 15).

With respect to Figures 36 and 45 as referred to in the Examiner's Final Action, *Hongo* teaches that the interchangeable electroless plating unit 112 may perform plating and cleaning operations without transferring the substrate (col. 37, lines 30-65 and col. 49, lines 10-33), but this does not teach the module in detachable communication with the factory interface including a pretreatment/post treatment cell and an electroless processing cell (*i.e.*, two separate cells within a single interchangeable/detachable unit/module). On the other hand and with regard to Figure 37 as pointed out by the Examiner, *Hongo* does indeed teach an embodiment of an detachable cleaning unit 116 as shown in Figure 31 (col. 38, lines 11-12) *separate* from the detachable electroless plating unit 112 of Fig. 31 and embodied in Figure 36, but this separation of units supports Applicants' position: *Hongo* does not teach or suggest that a detachable unit (a module in detachable communication as recited in claim 21) includes both a pretreatment/post treatment cell *and* an electroless processing cell. In other words, there are not two cells in any of *Hongo's* interchangeable units.

Therefore, *Hongo* does not anticipate or suggest claim 21. Accordingly, Applicants submit that independent claim 21, as well as claims 22-24 and 26-28 dependent therefrom, are allowable.

B. Obviousness of Claim 22 over *Hongo* in view of *Verhaverbeke**The Applicable Law*

The Examiner bears the initial burden of establishing a *prima facie* case of obviousness. See MPEP § 2142. To establish a *prima facie* case of obviousness three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one ordinary skill in the art to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP § 2143.

Claim 22 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Hongo* in view of *Verhaverbeke*. Applicants respectfully traverse this rejection on the basis that the present rejection fails to establish at least the third criterion.

The References

Hongo has already been described above.

Verhaverbeke is directed to a "method of a single wafer wet/dry cleaning apparatus comprising: a transfer chamber having a wafer handler contained therein; a first single wafer wet cleaning chamber directly coupled to the transfer chamber; and a first single wafer ashing chamber directly coupled to the transfer chamber" (Abstract). *Verhaverbeke* teaches a photolithography process tool having "a wafer handling robot 1808 on a single linear track 1806" (FIG. 18A and paragraph [0216] lines 8-9).

The Examiner's Argument

Regarding claim 22, the Examiner concedes that *Hongo* "fails to teach a substrate transfer robot compris[ing] a linear track-type robot configured to access each [of the] substrate processing modules" (page 6 of Examiner's Final Action). However, the Examiner states that "it would have been obvious to modify *Hongo et al* apparatus by substituting its substrate transfer robot with a linear track-type robot configured to access each of [the] substrate processing modules such as taught by *Verhaverbeke et al* in Figure 18A-18B for obvious advantage of simplification in design" (*Id.*).

Applicants' Response to the Examiner's Argument

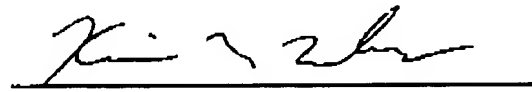
Respectfully, Applicants submit that the present rejection fails to establish a teaching or suggestion of all claim elements in support of a *prima facie* case of obviousness. Specifically, claim 22 depends from independent claim 21, which is believed to be allowable because *Hongo* does not teach one or more of the claimed elements, as described above. *Verhaverbeke* also does not teach, show, or suggest "each of the at least two substrate processing modules including a pretreatment/post treatment cell and an electroless processing cell." Accordingly, withdrawal of the rejection is respectfully requested.

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CONCLUSION

The Examiner errs in finding that claims 21, 23-24, and 26-28 are anticipated by *Hongo* under 35 U.S.C. § 102(e). The Examiner errs in finding that claim 22 is unpatentable over *Hongo* in view of *Verhaverbeke* under 35 U.S.C. § 103(a). Withdrawal of these rejections and allowance of all pending claims is respectfully requested.

Respectfully submitted,



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CLAIMS APPENDIX

1-20. (Canceled)

21. (Previously Presented) An electroless processing system, comprising:
a factory interface having a substrate transfer robot positioned therein, the factory interface being configured to communicate with at least one substrate containing cassette; and

at least two substrate processing modules in detachable communication with the factory interface, each of the at least two substrate processing modules including a pretreatment/post treatment cell and an electroless processing cell.

22. (Previously Presented) The electroless processing system of claim 21, wherein the substrate transfer robot comprises a linear track-type robot configured to access each of the substrate processing modules.

23. (Previously Presented) The electroless processing system of claim 21, wherein the at least two substrate processing modules further comprises a second substrate transfer robot positioned therein, the second substrate transfer robot being configured to transfer substrates between the substrate transfer robot in the factory interface, the pretreatment/post treatment cell, and the electroless processing cell.

24. (Previously Presented) The electroless processing system of claim 21, wherein the pretreatment/post treatment cell comprises a fluid processing cell configured to conduct at least one of rinsing, cleaning, edge bead removal, and spin rinse drying.

25. (Canceled)

26. (Previously Presented) The electroless processing system of claim 21, wherein the at least two substrate processing modules are interchangeable.

27. (Previously Presented) The electroless processing system of claim 21, wherein the pretreatment/post treatment cells are interchangeable within the processing system.

28. (Previously Presented) The electroless processing system of claim 21, wherein the substrate processing cells are interchangeable within the processing system.

29-31. (Canceled)

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.